


## From Research Learning to Research Production: Collective Methodology

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**Abstract:** The purpose of this research is to solve the problem of producing research (academic journals, books, book chapters) based on the curriculum. In this sense, the methodology called NODE PROJECTS has been developed. Its objective is to promote and manage collaborative scientific research based on the needs of the environment at a national and international level, generating new knowledge and innovation. The node projects are aimed at empathetic students with a theme and scenarios for its development so that they can participate as co-researchers and/or research assistants. Its scope is national and/or international depending on the nature of each project. Thus, it has been possible to evidence in a master's program, the development of a total of 86 research projects and their dissemination, during the years 2020, 2021 and 2022 in a much higher percentage than in previous years. These projects are built within the courses assigned to the line of research within the academic path of the program. The suggested research route is three 48-hour courses per term. The topics to be included in the courses would range from the formulation of the research project to the results, discussion, conclusions and of course its publication.

**Keywords:** Research Learning, Research Production, Collective Methodology

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### Introduction

Countries with knowledge-based economies tend to generate similar rates of economic growth with a continuous accumulation and transmission of knowledge that positively impacts their socioeconomic development (Mansell and Steinmueller 2000; Teitel, 1994). In Latin America and of course in Colombia, the results of science and technology (S&T) are not encouraging. Compared to developed countries, for decades there has been a low level of investment in research and development (R+D), human capital and technological infrastructure, and there is a low development of the knowledge-based economy (Casas, 2004).

Despite the recent problems of drug trafficking and violence, Colombia has a stable democratic system, social security problems and a concern to strengthen relations with developed countries such as the United States (Ardila, 2015). Between 2006 and 2013, Colombia contributed 4% of scientific publications in Latin America (RICYT, 2017). Understanding the relationship between economic growth and scientific and technological

development requires better S&T indicators (Teitel, 1985). This need is even more critical in Latin American countries with different research contexts, resources and policies from developed countries (Aguado and Becerril, 2016; Morales Gaitán and Aguado López, 2010).

Likewise, in Latin America and of course in Colombia, scientific productivity is concentrated in universities, an aspect that within the framework of organizational theory implies a similarity of the university organizational system with the business organizational system (Weick et al., 2009). It has been argued that scientific production encompasses multiple socioeconomic processes and variables, and reflects the scientific capacity of a country at the level of individuals, associations and consumers (Witter, 1997).

The present research proposes a collective methodology that has been designed and implemented by a master's level program of a Colombian university to solve the problem of research production (academic journals, books, book chapters) from the academic route defined in its curriculum. In this sense, the master's program has developed since the year of its implementation: 2018, a total of 86 research projects that have generated dissemination products such as journals, book chapters and books, during the years 2020, 2021 and 2022 in a much higher percentage than in previous years.

## Method

The proposed collective methodology is a dynamic and permanent research route throughout the study plan of the academic program, it has been called *NODE PROJECTS*. A node project is created by research professors of the academic program with the support of a research group associated with the institution.

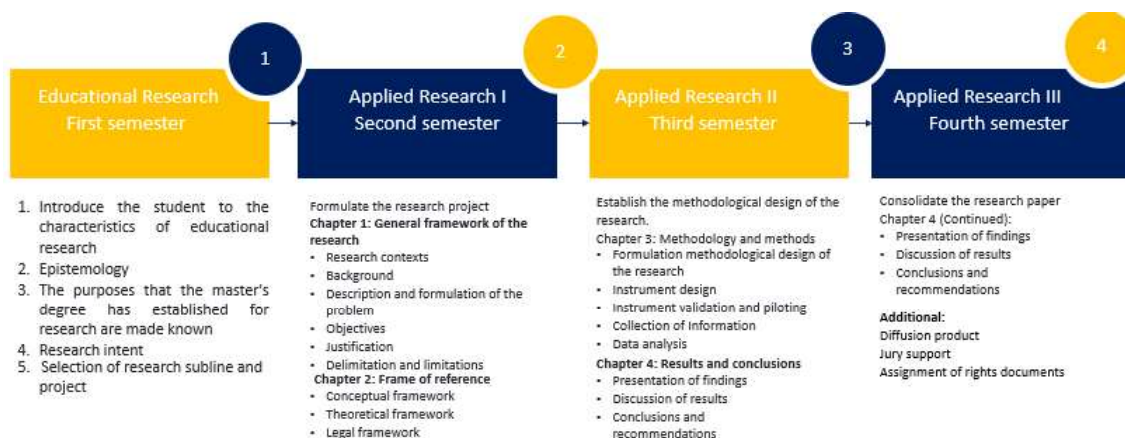


Figure 1. Methodology NODE PROJECT

Its objective is to promote and manage collaborative scientific research based on the needs of the environment at national and international level, generating new knowledge and innovation, through the publication of journals, book chapters in indexed journals and / or events of high academic impact.

Node projects are aimed at empathetic students with a theme and scenarios for their development to participate as co-researchers and/or research assistants as graduate students. Its scope is national and/or international depending on the nature of each project. These projects are built within the courses assigned to the research line within the academic route of the program. In that sense, the established design is as follows:

## Results

As of 2018, this methodology was implemented in a university in Colombia. They started with five lines of research and during the last 5 years, two additional ones have been created. They are:



Figure 2. Lines of Research

The following graph denotes the growth in percent of the research function compared to the other functions developed by the professors of the academic program of the Master of Education in recent years.

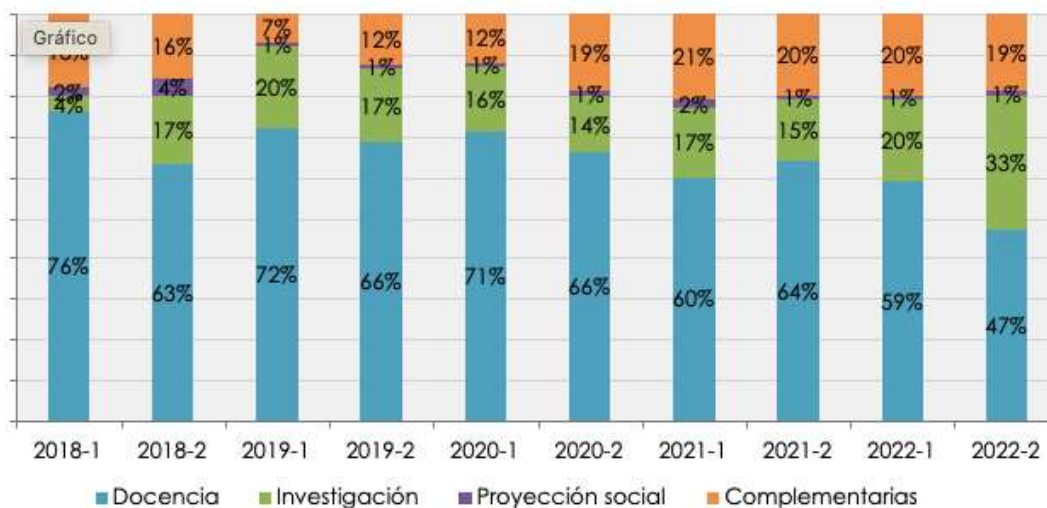


Figure 3. Comparison of the percentage of teaching time

Likewise, the implementation of the collective methodology explained above has increased the study groups that carry out research in the academic program. A study group is a strategy that promotes the grouping of students and professors to carry out research activities that go beyond the formal academic process and that stimulate the acquisition of research skills. The study groups that have been created and the semester-by-semester participation of students and professors is as follows:

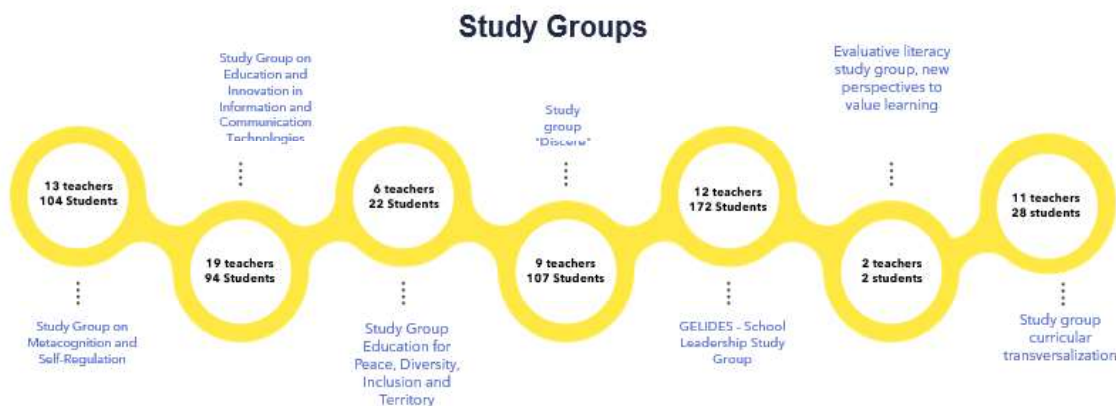


Figure 4. Study Groups

In addition to the increase in research projects,

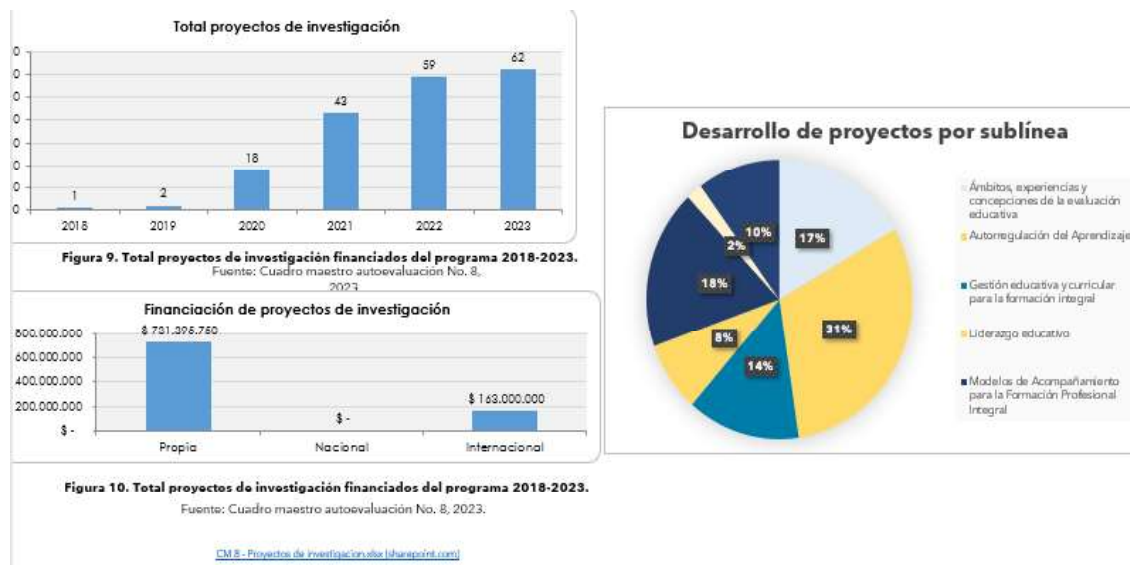


Figure 5. Research Projects 2018-2023

And finally, the growth in scientific publications, as a result of applied research projects, the object of study of this research.

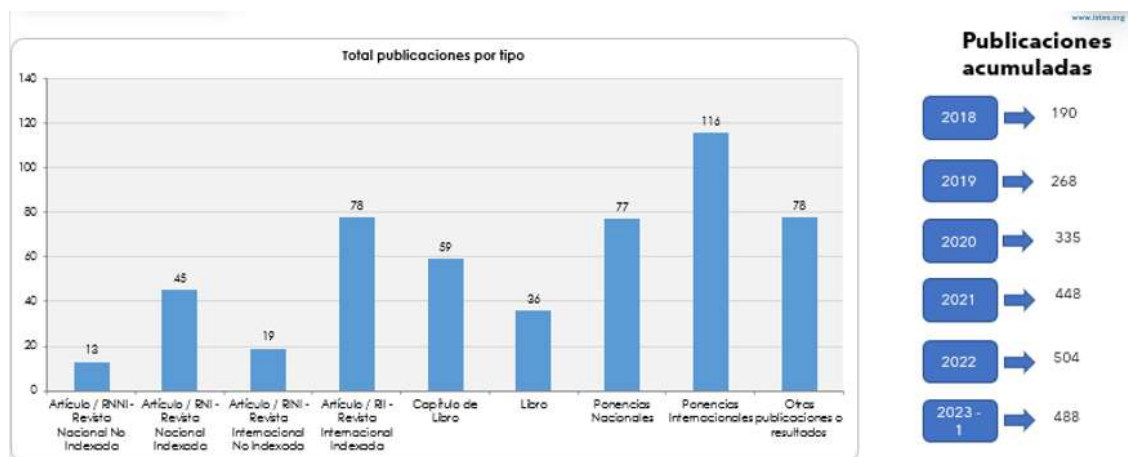


Figure 6. Publications developed between 2018 and 2023

## Conclusion

The results shown above attest to the achievements of the implementation of the collective methodology NODE PROJECTS. Research within the program is governed by the institutional policies and guidelines given by the Science, Technology, Innovation and Society System (STI&S). Likewise, the formative research route composed of four academic courses corresponding to 12 academic credits of the curriculum is recognized, which are articulated with the thematic axes and the areas of deepening of the program, thus allowing to strengthen the development of capacity for inquiry, critical thinking and in the approach and solution of problems.

In the same way, the implementation of strategies that strengthen teacher-student interaction is recognized from the development of co-authored research projects that strengthen scientific production and its impact at national and international level under the Node project approach.

On the other hand, in terms of academic production of students and teachers, the high participation of professors and students are evident in scientific events with a total of 176 papers, where knowledge is exchanged and new networks and learning communities are generated. It also highlights the publication of research results journals in national and international journals, as well as the production of 27 books research results and 49 book chapters. Several graduates have received recognition and distinctions for this (Annex 33). Likewise, the accumulated publications show a progressive advance in terms of forms of dissemination of research. As of 2018, production has been increasing at a higher rate, increasing year by year, reaching an accumulated of 434 publications made by 2022.

All of the above allows us to highlight that the impact of the program is produced thanks to this interaction with the environment from the training activities of each course. The node projects have made it possible for the program to be a reference in various contexts of the Colombian geography, from rural, local, regional, national

and international scenarios where teachers, students and graduates are present. These projects have allowed forging strategies, not only to research, but to generate knowledge through the promotion of high-impact publications, as well as the mobility and participation in scientific, academic and research events of professors and students.

## Recommendations

According to the experience in the implementation of the methodology described, it is suggested that the defined courses be included within the curriculum at the undergraduate or graduate level. On the other hand, it is suggested that the same teacher-advisor who starts the process with the first course, continue until completing the last course. Last but not least, the systematization of applied research projects and all their products is required; whether they are books research products, book chapters, articles in journals and presentations

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